



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	)	Confirmation No.: 7183
ARTLEY et al.	)	Examiner: Khan, Amina
Serial No.: 10/022,959	)	Art Unit 1751
Filed: December 18, 2001	)	Docket No.: T117 9001
	)	Customer No.: 64278

For: **POLYETHYLENE GLYCOL SATURATED SUBSTRATE AND  
METHOD OF MAKING**

DECLARATION UNDER 37 C.F.R. 1.132

I, John W. Artley, of 4 Park Avenue, Apt. 10-R, New York, NY state the following as true:

1. I am one of the co-inventors of the claimed subject matter in the above-referenced application.
2. The present application relates to a method of manufacturing a polyethylene glycol treated fabric. The method includes exposing a fabric to a polyethylene glycol formulation having both an acid catalysis and a resin (PEG). The treated fabric is then heated and cured to initiate a catalytic reaction for bonding the PEG formula to the fabric. The bonded fabric is first washed in a mild detergent to remove unreacted formulation and then neutralized in a separate bath to a pH of between about 6.5 and about 7.5 and then dried. The neutralization step is critical given that an acid catalyst is used to initiate the PEG reaction and any remaining acid residue hydrolyzes causing a reversal of the PEG reaction.
3. I am a licensee of the three Vigo/Bruno patents (the "Patents," or "Technology") and the corresponding technology. I was granted the license from the United States Department of Commerce where both Dr. Tyrone Vigo and Joe Bruno were employees of the United States Department of Agriculture Southern Regional Research Center. The

licensed Vigo/Bruno technology is equivalent to that taught in the cited Vigo Articles and Patents.

#### Vigo/Bruno Protocols Followed

I followed the Vigo/Bruno protocols, including washing and rinsing the treated fabrics with a detergent, as taught in the Vigo articles and Patents. The trials were conducted in East Providence, Rhode Island at a nonwoven airlaid media production facility owned by the AlliedSignal Corporation. AlliedSignal used the two airlaid production lines to manufacture nonwoven media for their automotive, and truck, filters.

One of the AlliedSignal production lines was modified to follow the Vigo/Bruno protocols by the addition of a specially fabricated shallow sheet metal saturation tank and rollers used to apply the PEG formula to the airlaid media. Immediately after, the formulation was cured. After rinsing out with water, in a second pass this same tank was used to wash in a mild detergent (as outlined in the Vigo/Bruno patents) the PEG-treated and cured nonwoven airlaid media.

#### Example 1: Pooling of the PEG following Vigo/Bruno Protocols vs. No Pooling in Claimed Method

The treated, cured, and washed, nonwoven media described above was to be made into prototype incontinence pads. By motor freight the treated goods arrived in Brooklyn for quilt stitching. The following morning a liquid was found draining from the rolls produced using the Vigo/Bruno protocols resulting in pooling at the bottom of the plastic wrapping material. This liquid was determined to be the formula applied to the nonwoven media at AlliedSignal. By following the claimed method, no pooling was observed.

#### Example 2: Washout of the PEG

Subsequently, following the Vigo/Bruno protocols, additional nonwoven substrates were treated at AlliedSignal. These treated substrates were made into prototype incontinence underpads. Prior to commencement of user trials, it was decided to conduct washability tests on the prototype underpads incorporating the licensed technology. The goal was one hundred wash/drying cycles (a loose industry standard) before the underpad

is thrown away as no longer being useable. Without meeting this standard, an incontinence underpad would not be a commercially viable product.

Approximately one hundred of the prototype underpads were taken to a special facility in York, Pennsylvania where blue jeans were stone washed in large commercial washer/dryer units for various manufacturers. The prototype pads (with an average cured dry weight determined first, becoming the "standard") were placed in several of the commercial laundry devices, and washed, and dried. As part of the testing process, after each wash/dry cycle, a sampling of the pads would be reweighed and compared against the previously determined standard. Even after the first wash/dry cycle, it was observed that the weight loss was significant. Perhaps by as much as twenty-percent. And so it was with each of the following wash/dry cycles, until after a few more cycles the prototype pads weighed approximately the same as a pad *not treated* with the Technology. In other words, there had been virtually a 100% washout of the PEG formulation from the treated pads. By following the claimed method, no washout was observed.

#### Discovery of the Solution to Pooling and Washout

Over a period of many months, and after the treating of literally thousand of running yards of various types of materials with the Technology, I and my co-inventor slowly were able to discover the solutions to the washout problem.

We discovered the criticality of the oven curing temperatures, and oven dwell times, and the neutralization of the residual acidity of a treated substrate. We discovered that if after the application of the Technology, and its subsequent curing, if the treated substrate was not quickly neutralized to a pH between about 6.5 to about 7.5, the residual acid content of the formulation still held within the treated substrate would negatively react with the crosslinking (bonding) of the polyethylene glycol to the fabric. This acidic reaction would cause the PEG formula to *debond* from the fabric, with the formula reverting to its viscous, and/or liquid state. Once this had occurred, the remnants of the formula would simply leach from the previously treated fabric.

After discovering that the hydrolyzed acidic residue residing in the treated PEG fabric resulted in the reversal of the PEG reaction, we then discovered that treating the fabric with a strong basic solution neutralized the finished fabric such that the acid residue was removed. Thus, the debonding of the formulation was eliminated, the hand

of the treated fabrics further improved, and, subsequently, the Technology was successfully and cost effectively applied to numerous fabrics and textile products with outstanding results. As an example, nonwoven incontinence underpads treated with the Technology after making changes to the process, successfully passed 125 wash/dry test cycles.

pH of Vigo Treated Fabric and the Claimed Present Method

The pH of treated fabrics following the Vigo/Bruno protocols had a final pH of between about 5 and about 5.5 after washing with a detergent, and the final pH of the treated fabric following the claimed method was in a range of between about 6.5 and about 7.5.

I hereby declare that all statements made herein are made of my own knowledge and are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of title 18 of the United States Code and that such willful and false statements may jeopardize the validity of the application or any patent issued there from.

  
John W. Artley

September 29, 2006  
Date